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AGRICULTURAL DIVERSITY IN THE PREHISTORIC SOUTHWEST

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ABSTRACT

Prehistoric Southwestern agricultural systems are characterized by their inherent diversity. Generalized models based on large-scale geographic (for example, desert and mesa) adaptations, or as reflective of cultural complexity, are not supported by existing evidence. Rather, the reconstruction of prehistoric farming systems demands attention to specific adaptive responses given highly localized environmental situations.

INTRODUCTION

Reconstruction of prehistoric agricultural systems continues to be a major focus of Southwestern research. In this connection, archaeologists have long recognized the importance of crop inventory, planting and harvesting scheduling, and water and soil manipulation (Hewett 1905; Bryan 1929; Schroeder 1965; Fontana 1974) in an area where all have played important roles and water is at a premium. Archaeological evidence amply reflects prehistoric farmers' attention to water and soil management through the survival of canals, check dams, reservoirs, flood plain field sites, and other agricultural features. While we thus recognize numerous farming mechanisms (Clark 1928; Stewart 1940; Woodbury 1961a, 1961b; Rohn 1963; Masse n.d.), our definitions of them tend to become components of a "template" that is uncritically superimposed on the whole Southwest. The result is to submerge the significant diversity in prehistoric economic systems (Cordell and Plog 1979). Accordingly, archaeologists must exercise caution in rendering simplistic interpretations.

The danger here is that we may slip into the notion that where a particular kind of farming (say, formalized irrigation) exists, it is characteristic of that particular area (and even of a culture). For example, canal irrigation is viewed as a hallmark desert adaptation frequently associated with the Hohokam.

The danger in this implicit one-to-one mapping of a single kind of farming system to a geographical area and to the people who inhabited it, is that it may blind us to the variation which really existed in the archaeological past and which still exists in the contemporary archaeological record. The typical farmer of such agriculturally marginal lands as those of the Southwest is much more interested in how to get a decent crop from *this* particular plot in *this* particular year than he is in providing an easily interpreted archaeological record. Thus we should not be so naive as to allow ourselves to fall into the trap of assuming that if a complex irrigation farming technology is manifested at one location in an area, then the same people who built it could not also have constructed a simple, unirrigated, undammed, unraised field only a few kilometers away. The converse is also true: the discovery of simple fields (or water control mechanisms, or whatever) does not preclude the existence of complex, elaborate ones just over the next rise.

A related conceptual error is that the absence of complex agricultural strategies, particularly water control strategies, speaks to us directly about the inability of a prehistoric population to organize and maintain them. Until we know the agricultural generosity of the land they farmed, it is equally possible that they had no need to develop them.

Such assumptions of uniform correspondence of culture and agriculture are not warranted by archaeological evidence which, to the contrary, suggests that water control and other cultivation strategies are largely induced by highly localized environmental factors, and that these factors have no simple correlation with other cultural variables. Such environments affecting agricultural adaptations encompass, for instance, local topography, hydrology, elevation, temperatures, precipitation patterns, native vegetation, soil chemistry and mechanics, and the length of growing season.

The Southwest can be viewed as a polar continuum characterized by diversified agricultural economies. These range from formal, highly structured systems, including canal irrigation, at one pole to relatively informal, loosely structured, "dry farming" systems relying on comparatively minor modifications of naturally occurring relief and hydrology at the other pole. The difference between irrigation agriculture and "dry farming" may be described as the degree of modification necessary to construct and maintain each. Dry farmers control a set of natural processes that would occur without human intervention, for example, run-off down a slope or over a canyon edge, water catchment in a weathered sandstone depression, or silt collection on an alluvial fan. The dry farmer modifies the natural relief with frequently simple devices, including check dams or terraces, and places his field accordingly. Moving away from the dry farming pole toward the irrigation pole, "dry farming" technology may become highly complex, as in the masonry canal and gate network remains observed by the author near Kin Bineola, southwest of Chaco Canyon.

In contrast, canal irrigation utilizing living water frequently (although not always) requires relatively great modification of existing conditions; gradients may be altered and streams controlled and channeled in new directions. In this sense, more is required of the irrigation agriculturalist; he must plan more and his canals may be more labor intensive over the long term. As we shall see in our examination of canal and dry farming, irrigation-agriculture labor-intensive systems should not, however, be confused with cultural complexity.

Above all, water control technologies, like other agricultural strategies, crosscut the Southwest. Examples illustrating either pole of the proposed continuum and all points between can be found in the desert and mesa country alike. Indeed, a continuum, in contrast to a broad geographic approach, is preferable in characterizing internally diversified agricultural systems because it demands that we examine *local* situations and *specific* responses to them.

SCHEDULING STRATEGIES AND CROP DIVERSIFICATION

A good place to begin the examination of the local specificity of agricultural techniques is with the crops themselves, since here we can apply modern agronomic and ethnographic data to the archaeological base.

The flexibility of prehistoric farmers is illustrated by their planting schedules and crop diversification. Our interpretations of agricultural systems have been characterized by a determination to define and classify their various components as we perceive them. Nowhere is our attitude more parochial than in the assumption that the cornerstone of Southwestern economy is simple cultivation of the corn-bean-squash triad (see Gasser 1979; Bohrer 1970).

No doubt corn, beans, squash or pumpkins, and probably cotton, were important crops, but these domesticates must not automatically be assumed to have been the primary elements of the total resource base. Nor can we assume that their cultivation was a matter of simple scheduling. To understand the nature of Southwestern agriculture, that is, crops in terms of their economic significance, we must again turn to considerations of localized environments (Gasser 1979; Goodyear 1975; Raab 1975; Bohrer 1970; Masse n.d.).

First, let us examine scheduling problems. In most areas of the Southwest, interseasonal and intraseasonal variation is common and, more importantly, unpredictable. Fluctuations in temperature and precipitation patterns preclude stable cropping under dry and irrigated farming conditions alike. The length of the growing season is one factor crucial to successful agriculture. It is usually defined as the annual number of frost-free days and depends primarily on elevation, latitude, mean temperature, and precipitation. The average length of different growing seasons is reported from numerous places: 229 days at Lee's Ferry in Glen Canyon (Adams and others 1961); 115-125 days in the Ranchos de Taos Valley near Taos, New Mexico (Herold and Luebben 1968); 165-170 days at Point of Pines (Woodbury 1961a). As variations in length of season are apparent from place to place, so is the degree of variation at the same place. At Cortez, Colorado, for instance, 146 frost free days were recorded in 1924 and 197 days in 1936 (United States Weather Service n.d.).

The average length of the growing season required for successful corn maturation is calculated at 110 days with mean temperatures no lower than 10 °C (Chang 1968:77). Though we may not be certain that the growing season